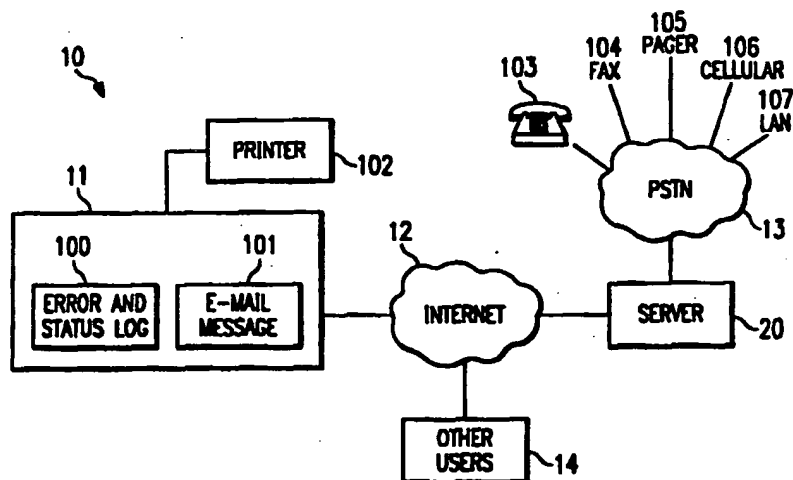




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(54) Title: E-MAIL SERVER FOR MESSAGE FILTERING AND ROUTING



(57) Abstract

The electronic mail server receives incoming mail from a sender, routes the incoming mail to a recipient, and determines which of the incoming mail is critical mail. The server has a filter database with profile information about the recipient and trigger criteria, a call generator that establishes communication with the recipient in accordance with the profile information, and a filter that correlates the incoming mail with the trigger criteria for determining which of the mail is critical mail. The call generator then notifies the recipient that critical mail has been received.

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E-MAIL SERVER FOR MESSAGE FILTERING AND ROUTING

TECHNICAL FIELD OF THE INVENTION

This invention relates to the routing and prioritizing of internet E-mail messages, and more particularly to the automatic notification of a party based upon the content of an E-mail message.

BACKGROUND OF THE INVENTION

E-mail or electronic mail and use of the internet for communications is becoming one of the widest deployed technologies ever. However, this deployment has been limited to person-to-person mail messages, and not to device-to-person or even device-to-device messages. A major problem is that many pieces of equipment, such as photocopiers, printers, and vending machines are not available with E-mail interfaces that allow for automatically sending status or alarm messages based on special conditions in that equipment to one or more E-mail addresses.

Another problem is that E-mail is a passive technology in that the mail is received and held in a mail box for the intended recipient until the recipient polls that mail box and actively queries that mail box to inspect for new mail. Moreover, critical, high priority mail may be mixed in the mail box with other E-mail of lower priority or less importance, such as personal messages or junk E-mail, causing high priority alert, status and alarm messages to be neglected for a period of time or, in the worst case, completely missed. Therefore, building a maintenance network around the internet is not practical due to the fact that such priority is lost when the message is mixed in with other internet messages.

Certain types of equipment, for example a PBX, can log an error and output that error to a printer, but often people are not located near the PBX, thus the PBX must send the error message by telephone in a traditional manner. It is not yet possible for the PBX to send E-mail messages directly to a particular address or to a plurality of locations. A further problem is that even if the equipment was capable of sending an E-mail message directly to a particular address, unless the recipient of the E-mail message is actually viewing the screen, there will be no immediate response to the E-mail message and perhaps a response may not occur for an extended period of time. Unquestionably, in an emergency situation, this is not an acceptable method for the delivery of critical messages.

SUMMARY OF THE INVENTION

The electronic mail server receives incoming mail from a sender, routes the incoming mail to a recipient, and determines which of the incoming mail is critical mail. The server has a filter database with profile
5 information about the recipient and includes custom selected trigger criteria for designating critical E-mail, and a call generator that establishes communication with the recipient in accordance with the profile information. The system operates so as to correlate the incoming mail with the trigger criteria for determining which of the mail is critical mail
10 and the call generator notifies the recipient that critical mail has been received. The server also has a database controller that alters the data stored in the database, particularly the profile information and the trigger criteria. The server may also be equipped with a text-to-speech converter that allows the recipient to receive the critical E-mail via telephone. The
15 server may have a feedback mechanism for relaying status information describing the status of the critical mail back to the sender, specifically whether the e-mail has been "opened". If the e-mail has not been opened within a time limit, an alternative notification mechanism is activated to notify alternative personnel, such as a supervisor, of the problem.

20 Application, Serial No. 08/806,556, filed concurrently herewith, having a common assignee, entitled INTELLIGENT E-MAIL INTERFACE, by Robert H. Frantz, is hereby incorporated by reference herein.

It is a feature of this invention to provide notification via real time
25 media of the recipient of an urgent E-mail message based on a filter database.

It is another feature of this invention to provide automatic response to the sender of the urgent E-mail message after certain criteria have expired.

30 It is another feature of this invention to filter incoming E-mail messages based on a customized filter which is stored in a filter database.

It is another feature of this invention to allow real-time adjustments of the filter database and the mail box destinations.

It is another feature of this invention to allow backup or supervisory personnel to be notified if the primary recipient does not respond to the
5 urgent E-mail.

Accordingly, it is a technical advantage of my invention that it allows the use of the low cost internet communication worldwide network for urgent and critical communications that were previously not reliable because of the passive nature of internet mail box operations.

10 A second technical advantage is that it allows notification via multiple technologies of the receipt of specially coded E-mail messages which trigger the special filter conditions configured by each mail box user.

A third technical advantage is that it allows automatic escalation or reference to backup personnel if not responded to within a given time limit
15 by the primary intended recipient.

A fourth advantage is that it allows the sender of the urgent E-mail to be notified if no contact is made with any of the intended recipients, either the primary, backup recipient or supervisory recipients, which further enhances the use of the internet for critical and urgent
20 communications.

The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of the invention as described hereinafter form the
25 subject of the claims of the invention. It should be appreciated by those skilled in the art that the conception and the specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent
30 constructions do not depart from the spirit and scope of the invention as set forth in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying drawings, in which:

5 FIGURE 1 shows a schematic of an E-mail system that uses the internet;

FIGURE 2 shows a schematic of the E-mail server; and

FIGURE 3 shows a flow diagram of the steps to notify the intended recipient of an urgent incoming E-mail message.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The invention is best embodied as an E-mail box server with two new, inventive functions. The first function is notification via real time media of the recipient of an urgent E-mail message based on a filter
5 criteria list by using communication devices such as telephones, pagers, and facsimile machines. The second function is an automatic response back to the sender of the urgent E-mail message after certain criteria have expired, such as exceeding a time limit for response from the intended recipient. This automatic response would notify the E-mail sender that
10 the emergency message has not been responded to, thereby allowing the sender to consider other courses of action.

In the first function, the E-mail box server filters the incoming E-mail messages based on a customized filter having trigger criteria, which is stored in a filter database. The trigger criteria can be set to activate on a
15 particular intended recipient, a particular sender, and/or words, phrases, or data, coded or otherwise, located in the various fields of the E-mail (such as the "from" field, the "to" field, the "subject" field, or the "text" field). If such a trigger is made, the server then queries the database for the profile of the user to inspect if the user has enabled notification via a pager, a fax
20 machine, an office or home phone number, or a cellular wireless phone number. Then, the server initiates outbound telephone calls to the enabled communication device(s) to notify the user, either through a voice message, a fax message or a pager notification that there is an urgent E-mail that meets the criteria in the filter list. The user can either connect
25 to the server and read the E-mail message, or if the server is equipped with text-to-speech functionality, the user can call via a phone line and listen to the contents of the E-mail message. If the database for this user also includes a fax number, the E-mail may be automatically converted to a fax and printed at the fax number indicated in the profile, as well as
30 delivered in the manner(s) described above.

Another function of the server is to allow real-time adjustments of the filter database and the mail box destinations. For instance, a

technician that is responsible for a certain geographical region of maintenance of a piece of equipment, logs in at the beginning of the shift, notifying the server's database that the technician can be contacted if any filtered messages, i.e., urgent or specially coded E-mail messages, are received from any of the equipment in the region. During that time, if such E-mail messages are received, the server will query the database, determining which technician is the technician to be notified, look in the technician's profile and notify the technician via pager, cellular telephone, fax or wireline telephone.

10 A further function of the server is to allow the profiles of backup or supervisory personnel to be assigned so that if the primary technician does not respond to the server's request in a timely manner, i.e., before a preset time limit expires, the server will re-query the database and locate a supervisor or a backup technician, access their profile(s) and notify them accordingly, relaying information regarding a non-responded request, by either sending notification over the pager, the fax, cellular phone, etc. If the second attempt, or multiple attempts, also do not result in a successful contact with a technician or responsible person, another E-mail message can be sent to the original sender of the request saying that emergency personnel were not successfully contacted, thereby allowing the sender to note that no action should be expected and that other courses of action should be taken.

FIGURE 1 shows four main components: a piece of equipment such as PBX 11, that is to be maintained or serviced and which is equipped with an E-mail message interface 101, the internet 12, an E-mail server 20, and a public switched telephone network (PSTN) 13, which has terminals such as telephones 103, fax machines 104, pagers 105, cellular phones 106 and LANs 107. Typically, PBX 11 will output error messages not only to its display panel (not shown) but also to an error log 100 and to a printer 102. The E-mail message interface 101 selectively outputs E-mail messages to internet 12 to specific addresses for maintenance personnel. There may also be on-line users at the PBX dialed into internet 12, such as

maintenance technicians or other agents 14, that send E-mail to maintenance server 20 in order to alert maintenance personnel that there is a problem or an urgent need.

Other examples of equipment for which this invention is useful include other telecommunications apparatus, a security/alarm system, a safety system that monitors detectors for fire, carbon monoxide, radon, poison gases, and/or water leakage, a vending machine that monitors the number of products and their expiration dates, a photocopier that monitors the amount of toner and paper, a home-type appliance such a refrigerator or washing machine, a weather alert system, a lighting system, a computer, a printer, a vehicle, a personal monitoring system that monitors the health and/or location of a person and a building environmental control system.

Server 20 is detailed in FIGURE 2, which includes a standard E-mail interface for internet 12. Router and a filter 202 receives the internet E-mails, verifies that they are intended for the addresses assigned to the users of mail boxes on that server, and queries the database for each intended recipient's profile which is stored in filter database 203. If the E-mail contains any of the trigger criteria as indicated in the filter database for that user, outbound call generator 204 is activated which attempts notification at the telephone line, the fax number, the pager number and/or the cellular phone for that particular user, as specified by the database. If the user is contacted on a voice line, such as a standard telephone line or cellular phone, an optional or enhanced feature would be to supply a text-to-speech conversion device 205 to actually read the message to the intended recipient. If the outbound call is made to a fax machine, then the internet E-mail message would be converted to a fax message and transmitted to the fax machine. Inbound call database controller 206 allows technicians to call in from standard telephones or cellular phones to update their profile in the filter database, placing themselves on duty, taking themselves off duty, change their pager number, fax number, or telephone number, their notification criteria, filter criteria, and/or revise the current supervisory or backup personnel.

FIGURE 3 shows the steps followed in order to implement the notification of the intended recipient of an urgent or triggered E-mail message. The first step is the equipment that is to be maintained or serviced, for example, PBX 11 (FIGURE 1), would detect an error or special status (step 300) that needs to be reported and would code an E-mail message and transmit that message via the internet addressed to the server and the intended recipient using a domain address in the well known manner. The internet would route (step 301) it to server 20, and the server would then receive (step 302) the E-mail and filter the E-mail for the special coding (step 303) as indicated by the entries in the filter database for that intended recipient.

If a trigger occurs due to a special code in the E-mail, (step 304) the server then re-accesses the database to activate the notification profile for that user, including the fax number, the pager number, LAN line and/or cellular numbers. The server would then place the outbound call (step 305) to the appropriate number or numbers specified by the profile and start a timer. If the intended recipient does not timely respond, then the server would again re-query the database to determine if another number should be used. For example, if a first call was placed to the cellular number without response, the server may call the pager number. If the intended recipient does not timely respond, then the server would again re-query the database (steps 306, 304) to determine if backup or supervisory personnel have been assigned for alternative notification. If no supervisory or backup personnel are configured into the profile for the intended recipient, the server will send an E-mail back to the originator, the PBX in this case, notifying the PBX that no action will be taken and another course of action should be pursued (step 311). If such backup personnel or supervisory personnel is detected, calls will be attempted (step 309) to that personnel, and if no response received (step 310), then an E-mail would be sent to the originator (step 311), notifying them that no action will be taken and another course of action should be pursued.

Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the invention as defined by the appended claims.

WHAT IS CLAIMED IS:

1. An electronic mail server for receiving incoming mail from a sender and for routing the incoming mail to a recipient, the server comprising:
 - a database having profile information about the recipient and
 - 5 trigger criteria;
 - means for signaling the recipient in accordance with the profile information; and
 - means for correlating incoming electronic mail with the trigger criteria for determining if a particular incoming mail message is to be
 - 10 treated special; and
 - means for activating the signaling means upon determination of a mail message that is to be treated special.
2. The server of claim 1, further comprising:
 - a database controller for altering both the profile information and
 - the trigger criteria.
3. The server of claim 1, further comprising:
 - a text-to-speech converter that allows the recipient to receive the
 - special mail message via telephone under control of the signaling means.
4. The server of claim 1, wherein the signaling means relays the special mail message to the recipient by activating at least one of the following:
 - a telephone line, a facsimile line, a pager, a cellular phone, an on-
 - 5 line computer, or a LAN line.
5. The server of claim 1, wherein the trigger criteria consists of at least one of the following contained with the mail message:
 - sender data, recipient data, chronometric data, subject data, text
 - data, or coded phrases.

6. The server of claim 1, further comprising:
means for relaying status information describing status of the
special mail back to the sender.

7. The server of claim 6, wherein the status information
discloses that the special mail has been examined by the recipient before
expiration of a preselected time period.

8. The server of claim 6, wherein the status information
discloses that the special mail has not been examined by the recipient
before expiration of a preselected time period.

9. The server of claim 1, further comprising:
means for notifying alternative personnel in accordance with the
profile information upon expiration of a time period.

10. The server of claim 1, wherein the profile information
consists of at least one of the following:

data relating to backup personnel, data relating to supervisory
personnel, data relating to a location of the recipient, or data relating to
5 availability of the recipient.

11. The server of claim 1, wherein the profile information
consists of information about at least one of the following:

a telephone line, a facsimile line, a pager, a cellular phone, or a LAN
line.

5 12. The server of claim 1, wherein the server routes the incoming
mail to the recipient in accordance with address data derived from the
incoming mail.

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13. An electronic mail system that uses a global network to deliver incoming mail to a recipient, the system comprising:
equipment located at an equipment site;
an E-mail link connecting the equipment site to the global network;

5 and

a server for receiving incoming mail from a sender at the equipment site, routing the incoming mail to a recipient, and for determining which of the incoming mail is critical mail, the server having

10 a database having profile information about the recipient and trigger criteria,

a call generator for establishing communication with the recipient in accordance with the profile information, and

a filter that correlates the incoming mail with the trigger criteria for determining the critical mail;

15 wherein the call generator is activated upon determination of critical mail.

14. The system of claim 13, wherein the server further comprises:
a database controller for altering both the profile information and the trigger criteria;

5 a text-to-speech converter that allows the recipient to receive the critical mail via telephone from the call generator;

feedback means for relaying status information describing status of the critical mail back to the sender; and

10 alternative notification means for notifying alternative personnel in accordance with the profile information upon expiration of a preselected time period.

15. The system of claim 13, wherein the sender is the equipment at the equipment site.

16. The system of claim 13, wherein the sender is a person at the equipment site.

17. The system of claim 13, wherein the equipment is a PBX.

18. The system of claim 13, wherein the equipment is at least one of the following:

a security system, a safety system, a vending machine, a photocopier, a home-type appliance, a computer, a printer, or a vehicle.

19. A method for receiving incoming electronic mail from a sender, routing the incoming mail to a recipient, and determining which of the incoming mail is critical mail, the method comprising the steps of:

5 storing profile information about the recipient and trigger criteria in a filter database;

correlating, by a filter, the incoming mail with the trigger criteria for determining the critical mail; and

10 establishing communication with the recipient in accordance with the profile information by a call generator upon determination of critical mail.

20. The method of claim 19, further comprising the step of: altering the data within the filter database.

21. The method of claim 19, further comprising the step of: converting text of the critical mail to speech thereby allowing the recipient to receive the critical mail via telephone from the call generator.

22. The method of claim 19, wherein the step of establishing communication is performed by activating at least one of the following:

a telephone line, a facsimile line, a pager, a cellular phone, an on-line computer line, or a LAN line.

23. The method of claim 19, wherein the trigger criteria consists of at least one of the following:

sender data, recipient data, chronometric data, subject data, text data, or coded phrases.

24. The method of claim 19, further comprising the step of: relaying feedback information describing status of the critical mail back to the sender.

25. The method of claim 24, wherein the feedback information discloses that the critical mail has been examined by the recipient before expiration of a preselected time period.

26. The method of claim 24, wherein the feedback information discloses that the critical mail has not been examined by the recipient before expiration of a preselected time period.

27. The method of claim 26, further comprising the step of: notifying alternative personnel in accordance with the profile information upon expiration of the time period.

28. The method of claim 19, wherein the profile information consists of at least one of the following:

5 data relating to backup personnel, data relating to supervisory personnel, data relating to a location of the recipient, or data relating to availability of the recipient.

29. The method of claim 19, wherein the profile information consists of information about at least one of the following:

a telephone line, a facsimile line, a pager, a cellular phone, or a LAN line.

